

PERSPECTIVES

Newsletter of the North-South Centre
No. 4 | September 2011



“I saw an opportunity for the poor people to change their lives if ICT could be brought to them to meet their needs.”

Prof. Muhammad Yunus,
Nobel Peace Prize Lecture, 2006

Editorial

According to the 2010 UN Information Economy Report, information and communication technologies (ICTs) are creating millions of new jobs and micro-enterprises in developing countries. Are ICTs, thus, an important driver for development? Just as the term “Information and communication technologies for development”, short ICT4D, indicates? ICT4D can have many purposes – ranging from providing platforms, to technical and socio-political applications and, as mentioned above, economic impact. Or, as Kleine and Unwin of the UNESCO Chair in ICT4D put it: “It is indeed the multipurpose nature of ICTs such as the internet and mobile phones that make them enablers not just of the business plans of large companies and power fantasies of governments, but of the hopes and choices of grassroots NGOs, micro-entrepreneurs and individuals who use the technologies in their own ways.”¹

In this issue of “Perspectives” we will have a closer look to the “what” and

the “who” of the ICT4D debate. We will also reflect on the potential role of the ETH Zurich in this domain. How could the broad range of expertise gathered at the ETH Zurich contribute to the development target in ICT4D? An example by Lian Pin Koh illustrates how the combination of environmental sciences and technical application allows for increasing the impact of the initial scientific findings.

ICT4D is also the topic of the North-South Centre annual conference 2011. By discussing the multipurpose nature of ICTs, we try to appeal to a broader circle of scientists within ETH Zurich, calling on their contribution to research for development.

*Wolfgang Kinzelbach,
President of the North-South Centre*

¹ Kleine, D., Unwin, T., 2009: Technological revolution, evolution and new dependencies: what’s new about ICT4D? *Third World Quarterly*, 30(5): 1063.

ICT4D

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ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Focus

ICT4D – How could the ETH Zurich get involved in it?

Information and Communication Technologies for Development (ICT4D) is a very relevant and widely researched topic. The ETH Zurich is facing the challenges to balance the engineering potentials for the developing countries and the scientific mission.

In 2007, 4.1 billion mobile phone accounts have been deployed worldwide with two-thirds of them, around 2.7 billion, in developing countries. With 50% per year, Africa exhibits the highest subscriber growth in the world¹. Although originally designed in and for Northern countries, the penetration of mobile phones in developing countries can be described as “the most believable sort of revolution: one that pays for itself”².

Access to wireless communication is complemented by internet technology, which will be available soon – even in faraway rural and underdeveloped territories.

The socio-economic impact of information communication technology (ICT) became obvious not only in the 2011 Arabic riots. The strong correlation between ICT penetration and economic

growth in developing countries has been documented repeatedly, for example by Waverman *et al.*³. The OECD estimated the importance of ICT in a workshop in September 2009 stating that “ICTs are crucial to reducing poverty, improving access to health and education services and creating new sources of income and employment for the poor. Being able to access and use ICTs has become a major factor in driving competitiveness,



Mounting a wireless antenna near Ifrane, Morocco

Hans Hinterberger has been Professor of Computer Science at the ETH Zurich from November 1999 to October 2010.

www.ite.ethz.ch

In another light ...

Information and communication technologies for development (ICT4D) is a broad topic. Whereas Gerhard Tröster highlights the potential involvement of many ETH scientists, Hans Hinterberger focuses on already existing ETH contributions.

Instead of seeing the technology behind, one can look at ICT4D by treating ICT as an enabling science, making its application and those who benefit from it – the “4D” – the focus of attention. This, of course, is not easy to fit into the agenda of a technical university. But, it could enrich research efforts in the domains of teaching and the management of sensitive data – issues strongly affected by culture. Two examples carried out at the Department of Computer Science shall illustrate this idea.

One example is a joint project with the African Technology Development Forum (ATDF), with the support and collaboration of the NCCR Trade Regulation based at the World Trade Institute of the University of Bern. The goal has been to develop an e-mentoring platform that matches African entrepreneurs with

Swiss and European experts in order to assist, amongst others, the UNCTAD-Empretec centers.
<http://match.atdforum.org/>

As part of a second project, we provide e-tutoring materials – translated into English with the support of the North-South Centre – as well as software for secure e-assessments to the Technical Trainers College Riyadh, Saudi Arabia.

Both projects provide interesting test beds for ICT applications with challenges that complement and enrich local research issues in many unforeseen ways. So maybe the question should be: “ICT4D – How can the ETH Zurich get more involved in it?”

Hans Hinterberger

Telephone charging, Uganda



economic growth and social development. In the last decade, ICTs, particularly mobile phones, have also opened up new channels for the free flow of ideas and opinions, thereby promoting democracy and human rights⁴. A critical reflection on the status of ICT4D can be found in Kleine and Unwin⁵. They argue, amongst others, that many ICT4D initiatives tend to fail to learn from previous initiatives, and show a tendency to be top-down and supply led. Nevertheless, Kleine and Unwin see a great potential of ICT4D as these technologies offer scales and pace not previously envisaged. ICT4D also shows potential for more democratic forms of interaction and knowledge production, or – especially in the case of mobile telephony – for the democratisation of digital technologies.

ICT4D at the global scale

The relevance of ICT4D is reflected in many organisational and academic activities that have observed and analysed the penetration and impact of ICT in developing countries over the past decade.

Already in December 2003, the *ICT for Development Platform* took place in Geneva, organised within the framework of the *World Summit on Information Society (WSIS)*, which attracted more than 11'000 delegates from 175 countries. At that time, this was the largest ever event to discuss ICT4D⁶. Furthermore, the *ICTD Conference Series* originated 2006 in Berkeley. In the words of the organisers, the series has established as the “premier conference examining the role of computers and communications in social, economic and political development”⁷.

In 2004, the *Technology and Infrastructure for Emerging Regions (TIER)*⁸ research group has been founded at Berkeley University. Its projects – mainly in the field of computer science – are dealing with educational questions (mobile learning), healthcare (remote medical consultation), or speech (multilingual educational tools). Furthermore, the *ICT4D Collective*⁹ was initiated in London that same year. The collective is a group of people committed to undertaking the highest possible quality of research in the field of ICT4D, and making the results of this available freely to the global community. In 2007, the Collective was awarded the Status of a UNESCO Chair in ICT4D. Other initiatives, such as the *TechBridgeWorld*¹⁰ initiative pursue less research and more educational support. Their “education e-Village” project, for example, is designing an online virtual community of educators addressing the needs in developing regions.

Using the search item ICT4D, the search engine “Google Scholar” lists more than 2'400 publications covering socio-economic as well as technological aspects. The most cited paper by Heeks¹¹ describes the requirements for the next

ICT4D phase in technologies, approaches and integration.

The initiative *Artificial Intelligence for Development*, a subgroup of the *Association for Advancement of Artificial Intelligence (AAAI)*, aims at applying artificial intelligence techniques to the “unprecedented volume of data currently being generated in the developing world on human health, movement, communication, and financial transactions”¹².

Three organisations, the world's largest engineering association *Institute of Electrical and Electronics Engineers (IEEE)*, the *American Society of Mechanical Engineers (ASME)* and *Engineers without Borders (EWB)* have founded the online platform *Engineering for Change*¹³ as a forum to connect, collaborate, solve challenges and share knowledge among a growing community of engineers, technologists, social scientists, NGOs, local governments and community advocates. Currently, more than 6'500 people have registered as members of the forum.

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Introducing a local village girl to the use of the web, Mali

ICT4D at the ETH Zurich?

Since 2009, the strategy of the North-South Centre defines “Technology and infrastructure” as one of its four thematic research areas. Considering the importance of ICT in research and education at the ETH Zurich, ICT4D could play a dominant role within this research area. However, it is not so obvious how to exploit these potentials for development.

Research at the ETH Zurich is oriented towards the frontiers in science, facing international competition and focusing mainly on appealing applications for the “North”. The preference of engineering research for the design of services and systems, rather than for the analysis of past developments could be another reason why the “North countries academia” did not extensively promote ICT4D research in the past.

At the ETH Zurich, several disciplines can contribute to ICT4D: Understanding the social, political and economic contexts of ICT in developing countries fits

into the strategy of the departments of Management, Technology, and Economics (MTEC) as well as Humanities, Social and Political Sciences (GESS). The approach of solving specific problems of developing regions by using scientific methods as approved by the *Artificial Intelligence Community*¹⁰, addresses core activities of the departments of Computer Science (INFK), Information Technology and Electrical Engineering (ITET) and Mathematics (MATH). Combining the ETH expertise in food, nutrition as well as healthcare and life science with the existing ICT competences could result in a unique ETH ICT4D strategy.

Gerhard Tröster

Gerhard Tröster has been Full Professor of Electronics at the ETH Zurich since August 1993.

www.ife.ee.ethz.ch

Notes

- 1 Singh, R., 2009: Mobile phones for development and profit: a win-win scenario. Overseas Development Institute, UK: www.odi.org.uk
- 2 Zuckermann, E., 2010: Decentralizing the mobile phone: A second ICT4D revolution? *Information Technologies & International Development*, 6(SE 2010): 99–103.
- 3 Waverman, L., Meschi, M., Fuss, M., 2005: The impact of telecoms on economic growth in developing countries. In: *Africa: The impact of mobile phones*. The Vodafone Policy Paper Series, 2: 10–23.
- 4 Workshop “Policy coherence on the application of ICT4D”: www.oecd.org/ICT/4D In cooperation with the World Bank initiative infoDev: www.infodev.org
- 5 Kleine, D., Unwin, T., 2009: Technological revolution, evolution and new dependencies: what’s new about ICT4D? *Third World Quarterly*, 30(5): 1045–1067, <http://dx.doi.org/10.1080/01436590902959339>.
- 6 www.globalknowledge.org/ict4d
- 7 www.ictd2012.org
- 8 <http://tier.cs.berkeley.edu>
- 9 www.ict4d.org.uk
- 10 <http://techbridgeworld.org>
- 11 Heeks, R., 2008: ICT4D 2.0: The next phase of applying ICT for international development. *Computer*, 41 (6): 26–33, [doi:10.1109/MC.2008.192](http://dx.doi.org/10.1109/MC.2008.192).
- 12 <http://ai-d.org>
- 13 www.engineeringforchange.org

«Denkplatz Entwicklung»

Event series in the context of the 50th anniversary of SDC

ICT4D – The development impact of information and communication technologies
Annual conference of the North-South Centre

Thursday, 10 November 2011, 09:00–18.00 h

Main building of the ETH Zurich, Auditorium Maximum, HG F 30, Rämistrasse 101, Zurich

Key speakers

- Naguib Sawiris, Orascom Telecom, Cairo (Egypt)
- Jacques Bonjawo, Genesis Telecare, Yaoundé (Cameroon) and Washington (USA)



Research

Environmental iTools: Mobile applications for land use decision-support

Developing mobile applications will make the decision-support tools available to all segments of society: From the farmer who has to decide how to develop the land, to the minister of agriculture who needs to make science-based development decisions.

By 2015, there will be 1.2 billion additional internet users in the rapidly developing nations of Brazil, Russia, India, China and Indonesia. Most of these people will be accessing the internet via their mobile communication devices such as Apple's iPhone and other "smart" phones. To leverage on these technological and societal trends, we seek to develop web-based and mobile applications for two land-use decision-support tools. These tools enable decision-makers to evaluate the environmental and financial consequences and trade-offs of their development strategies.

The two theoretical models

First, we developed matrix-calibrated and edge-corrected species-area models that allow users to evaluate the biodiversity consequence and trade-offs of land-use decisions. Further, the models account for the deleterious effects of forest edges on species extinction risks. Second, we developed spatially-explicit scenario analyses which allow users to assess the environmental and socio-economic implications and trade-offs of pursuing alternative land-use and development options, particularly in the context of agricultural expansion and carbon payment schemes (e.g. REDD+).

The two mobile applications

One mobile application will predict biodiversity impacts. Using this tool on the mobile devices, one can easily explore questions concerning trade-offs in terms of landscape-level biodiversity under alternative land-use scenarios. For example, the application can be used to evaluate the biodiversity consequences of converting large extents of a forested landscape to extensive but wildlife-friendly agriculture versus con-

verting smaller extents of the landscape to intensive production systems. These theoretical models have profound implications for conservation practitioners in that they allow assessments of the degree by which extinction risk could be reduced, or biodiversity be enhanced, through improvements in landscape characteristics.

The other mobile application allows for rapid and comprehensive trade-off analyses. This tool will expand upon the species-area models to also account for the impacts of land-use decisions on food and biofuel production, carbon storage and sequestration, and financial returns. By allowing end-users to evaluate the trade-offs among these partially competing priorities, this decision-support tool will assist developing country policy-makers, land users and land owners to reconcile these objectives on the bases of the biophysical, socio-economic, and technical constraints and considerations within individual societies and landscapes.

A participatory approach

An important aspect is the participatory approach to the development of these web-based and mobile applications which involves managers of oil palm plantations in Indonesia, smallholder farmers, and managers of a REDD+ project in Kenya. Their feedback will be integrated into the development of the applications. The experience of developing such tools in collaboration with a software development group and through a participatory approach by seeking feedback from various stakeholders in developing countries will form a strong foundation for similar partnerships in future projects. Such a

cross-disciplinary collaboration is non-traditional, radical and high-risk in nature. It is also exceedingly rare in the environmental sciences. But by the same token, this research could yield significant pay-offs for the advancement of conservation science, policy and practice.

Lian Pin Koh

Lian Pin Koh has been SNSF Professor of Applied Ecology and Conservation at the ETH Zurich since January 2011.

www.lianpinkoh.com

Polygon plotting on google map: Users can define regions of primary forests, secondary forests, oil palm plantations, and any other habitat types, within an actual landscape. The calculator parses this spatial information, and extracts land-use parameters that are fed into the ecological model, which is working in the background.



Portfolio

The good, the bad and the unintended casualty of the climate change debate

“Both droughts and floods are natural consequences of a warming world: droughts because it’s hotter, floods because warm oceans release more water vapour.”

This quote by Paul Krugman is taken from the *New York Times*.¹

The nontrivial contradiction embedded in the bold statement, and similar oversimplified generalisations, are counterproductive and may erode credibility of future scenarios upon which far-reaching societal and economic decisions are advocated. While most would agree with the main theme raised by Krugman concerning the uncertain future of food security, the issue deserves a broader context



Bioethanol production – e.g. sugarcane harvesting in São Paulo State, Brazil – is often competing with agricultural land use.

than the popular and simplified climate change extrapolations.

Climate change debate – The good

Proponents of climate change have done an admirable job of generating an unprecedented level of public awareness supported by the global political apparatus mobilised to address potential consequences of global climate.

Climate change debate – The bad

Politicisation of the debate invariably leads to dogmatic oversimplifications that push aside potentially more urgent

global challenges that are only indirectly linked with climate change, such as food security.

Climate change debate – The casualty

We argue that the dominance of the climate change agenda has unintentionally exacerbated food security concerns in three main areas. First, climate change is portrayed by many as the most urgent global environmental challenge faced by mankind. However, as Krugman correctly argues, the prospects for outbreak of worldwide hunger are far more imminent and unfortunately more certain. Second, the unprecedented funding levels for climate change research eclipse the urgency and scope of developing capabilities and strategies to feed an estimated additional three billion people within the next few decades. Third, the growing tendency to consider issues of resource scarcity, energy and food production primarily through the spectacles of global climate perpetuates the perception that food security is merely a particular outcome of global climate change.

The world human population is estimated to exceed 9 billion by 2050 with associated food requirements rising by 70 to 100%. The urgent challenge of matching demand for food by a larger and more affluent population requires radical changes in the way food is produced, stored, distributed, and accessed. The limited reserves of water and arable land, their imbalanced geographic distribution, and the increase in competition for their alternative uses, limit the scope of agricultural expansion as occurred during the Green Revolution. Hence, the primary strategy is limited to increasing food

production using a similar amount of land by focusing primarily on closing the so-called yield gap. This means, namely, increasing production limits, reducing waste, changing diets, and expanding aquaculture. The limited availability of water resources severely constrains the extent of enhanced crop production by irrigation within the available land footprint – especially with most population growth projected to occur in countries, which are chronically short of water. The entanglement of climate change concerns with sustainable energy security represents an agenda promoted primarily by developed economies. The consequences, however, adversely impact food security and diminish prospects for a global agreement that addresses climate change and food security equitably – with due attention to the pressing needs of the developing world.

Notwithstanding the importance and urgency of climate change and related energy policy, the imminence of food-deprived large populations and attendant disruption of geopolitical stability are of great societal importance. They merit increased scientific and socio-political attention, allowing to address these challenges at their appropriate level of urgency.

Dani Or, Institute of Terrestrial Ecosystems, ETH Zurich, Switzerland

Shmuel Assouline, Institute of Soil, Water and Environmental Sciences, Agricultural Research Organization-Volcani Center, Israel

¹ Op-Ed Columnist, “Droughts, floods and food” by Paul Krugman, *The New York Times*, 06.02.11 www.nytimes.com/2011/02/07/opinion/07krugman.html

Portrait

Alexandra Horst – Conducting fieldwork in Kampala, Uganda

Alexandra Horst is a doctoral student at the Chair of Development Economics at NADEL. In her dissertation, Alexandra makes use of field experiments to find economic solutions to increase the demand for improved sanitation in urban slums of sub-Saharan Africa.

Alexandra Horst, you are currently doing your doctoral research on the economics of sanitation in developing countries. In short, what are you investigating?

Alexandra Horst: My research focuses on the analysis of household demand for sanitation and the identification of economic constraints that underlie the persistently low private investment into sanitation facilities in poor sub-Saharan African urban settlements. I am particularly interested in households' willingness to pay for various sanitation systems, considering different usage and financing arrangements. Thanks to a funding award by the EU Water Initiative, I am currently conducting a randomised controlled trial in Uganda's capital Kampala.

An estimated 2.6 billion people worldwide still have no access to improved sanitation facilities. What are the main reasons for this lack of access in the urban slums of Kampala?

To answer this question, we conducted a survey of 1'500 households and found that most of these households actually do have access to some form of sanitation. However, 85% share a facility with an average of 30 people, which leads to unhygienic conditions and the common use of "flying toilets" (plastic bags used as toilets). These practices call into question the true level of sanitation access. According to our first results, there are three predominant challenges regarding access to private and good-quality facilities: First, the price of an improved sanitation facility in Kampala amounts to about CHF 500, which is more than one year's per capita income of a typical poor household. Second, insecure land rights discourage invest-

ment into sanitation. Third, around 70% of Kampala's poor are tenants who frequently move within the city, leaving them with little negotiating power towards their landlords to provide them with adequate sanitation.

In your eyes, what are the main technological barriers to ensuring sanitation provision for all inhabitants of these slums?

Due to fast and unplanned urban growth, water scarcity, and unclear public sector responsibilities, centralised sewerage systems as in Europe are generally not considered a feasible option for most poor urban areas in Africa. But appropriate decentralised on-site sanitation technologies already exist for these areas. Hence, I don't see main technological barriers when it comes to sanitation solutions. Problems rather evolve because of various types of social and economic barriers. However, one crucial technological shortcoming in my opinion is a cheap and effective technology for emptying on-site systems, which are often abandoned after a couple of years because they either cannot be emptied or because the costs are considered to be too high by households.

At which level of decision-making are the main bottlenecks for appropriate sanitation provision?

To reach adequate sanitation coverage in developing countries, all levels of decision-making must function and interact well. From my field research, I am mostly familiar with household level bottlenecks, such as the relatively low willingness to contribute to the high up-front costs of sanitation. At the state level, Uganda has a law obliging land-



Alexandra Horst started her doctoral studies at the Centre for Development and Cooperation (NADEL) in September 2009. The focus of her work lies in the analysis of private investment in sanitation and in the development of innovative financial mechanisms, which aim to stimulate a higher demand for sanitation products and services in urban slum areas. Before joining NADEL, she worked as consultant at the Inter-American Development Bank in the Infrastructure and Environment Department.

www.nadel.ethz.ch

lords to provide each tenant with a sanitation facility. In practice, however, there is little or no compliance with this law.

In the field of sanitation economics, where do you see a market?

There is certainly some potential for market-based sanitation provision in poor urban areas because demand is unquestionably present. In the case of Kampala, however, some public support in form of partial subsidies for the poorest might be required given the high initial construction costs, positive health externalities of improved sanitation, and insecure property rights. The feasibility and effectiveness of such subsidies is something I am testing in my ongoing field experiment.

Newsflash

«Denkplatz Entwicklung» Celebrating 50 years of SDC

From 30 September to 11 November 2011, the ETH Zurich will celebrate the 50th anniversary of SDC with a series of events discussing the past, present and future of Swiss development cooperation and its link to research.

On 30 September, the series starts with an opening event on change and continuity in Swiss development cooperation. **Key speaker is Micheline Calmy-Rey, President of the Swiss Confederation.**

Throughout the six weeks, an exhibition «Die andere Seite der Welt/L'autre côté du monde» (in German and French) is reflecting on the history of

the humanitarian tradition of Switzerland since 1945.

Besides several events, which are targeted at specific audiences – such as a student workshop on visions for international cooperation, a historical colloquium or workshops with school classes – two public events shall be highlighted here. Both of them are taking place in the Auditorium Maximum, ETH Zurich.

Is foreign aid good or bad for Africa?
Public talk and panel discussion (in English), Friday, 14 October, 16:00 h

Was darf uns Solidarität kosten? Das Engagement der Schweiz in der Welt
Public talk and panel discussion (in German), Wednesday, 2 November, 19:30 h

www.50jahredeza.ethz.ch

Announcements

North-South Forum on water diplomacy_The next North-South Forum jointly organised by the NCCR North-South and the North-South Centre, will discuss the opportunities and pitfalls of water diplomacy concentrating on international rivers in the global South. **Basel, 28 November 2011.**
www.northsouth.ethz.ch

Sawiris Scholarships: Call for concept notes_The Sawiris Scholarships promote doctoral research for the benefit of developing countries. The projects have to be innovative and develop a method or product,

which is directly relevant for improving the livelihoods of poor people in developing countries. **Deadline for submission is 31 October 2011.**
www.northsouth.ethz.ch

MAS in Development and Cooperation, 2012–2014_The Master of Advanced Studies in Development and Cooperation of ETH Zurich prepares graduates for the work in the field of development cooperation. **Applications can be submitted between 1 January and 29 February 2012 through the Centre for Continuing Education of the ETH Zurich.**
www.nadel.ethz.ch
www.zfw.ethz.ch/application

SDC-SNSF Fund for Research on Global Issues_The joint fund for research on global issues in and with developing and emerging countries will support projects generating knowledge and innovative solutions in Africa, Asia and Latin America as of 2012. **SDC and SNSF will organise a joint orientation and exchange event in December 2011.**
www.snf.ch/E/international/world-wide/sdc-snsf-research-fund/Pages/default.aspx

Impressum

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